REMARKS

Claims 32, 37, 40, 50, 51, and 61 have been amended. Claims 34, 41, 43, and 58 have been canceled. Claim 63 has been added. Claims 32, 36-40, 42, 44-48, 50-51, 59-61, and 63 are now pending. Applicants reserve the right to pursue the original claims and other claims in this and other applications. Applicants respectfully request reconsideration of the above-referenced application in light of the amendments and following remarks.

Claims 43 and 58 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite. Claims 43 and 58 have been canceled. Accordingly, the rejection is now moot.

Applicants acknowledge with appreciation that claim 60 is in condition for allowance. Applicants also respectfully submit that claims 32, 36-40, 42, 44-48, 50-51, 59, 61, and 63 are also in condition for allowance for the following reasons.

Claims 32, 34, 36-38, and 59 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No.: 6,200,734 ("Blatchford"). The rejection is respectfully traversed.

Blatchford does not disclose an integrated circuit comprising "a reflective layer having a reflective upper surface defining a first interface; a first anti-reflective coating layer formed over the reflective layer, the first anti-reflective coating layer having a first index of refraction, a first absorption, a first thickness, and an upper surface defining a second interface; a second anti-reflective coating layer formed over said first anti-reflective coating layer, the second anti-reflective coating layer having a second index of refraction, a second absorption, a second thickness, and an upper surface defining a third interface, wherein the first, second, and third interface reflects

radiation, and wherein the indices of refraction, absorptions, and thicknesses of the first and second anti-reflective coating layers are such that the amplitudes are approximately equal and the phase differences of the reflected radiation from said first, second, and third interfaces substantially mutually cancel when combined," as recited in claim 32.

Blatchford does not teach an integrated circuit structure comprising a first, second, and third interface that reflects radiation. In Applicants' claimed structure, the reflected radiation from the first, second, and third interface substantially mutually cancel when combined. Blatchford does not disclose a structure in which the amplitudes are approximately equal from the reflected radiation. Similarly, Blatchford does not disclose a structure in which the phase differences of the reflected radiation substantially mutually cancel when combined.

Blatchford, in contrast, discloses a structure with at least five interfaces (FIG. 1). The first interface is the surface of metal layer 18, the second interface is the surface of first anti-reflective coating layer 13, the third interface is the surface of second anti-reflective coating layer 14, the fourth interface is the surface of third anti-reflecting coating layer 15, and the fifth interface is the surface of additional oxynitride layer 19 (FIG. 1). Blatchford does not disclose a first, second, and third interface that reflects radiation.

The Office Action further asserts that the limitations reciting how the indices of refraction, absorption, and thicknesses are chosen, are process limitations which do not further limit the product claims. Applicants respectfully submit that claim 32 is a structure claim and does not recite process limitations. Claim 32 recites a structure that has structural properties, e.g., indices of refraction, absorption, and thicknesses, such that the amplitudes are approximately equal and the phase differences of reflected radiation from a first, second, and third interface substantially mutually cancel when

they are combined. In other words, claim 32 recites a structure with certain properties that result in the cancellation of reflected light.

Accordingly, Blatchford does not disclose a structure in which the amplitudes are approximately equal from the reflected radiation. Similarly, Blatchford does not disclose a structure in which the phase differences of the reflected radiation substantially mutually cancel when combined. Claim 32 recites structural limitations of the first and second anti-reflective coating layers having indices of refraction, absorptions, and thicknesses for each respective layer, which result in reflected radiation with approximately equal amplitudes and have phase differences that substantially cancel when combined.

Accordingly, claim 32 is not anticipated by Blatchford. Claims 34, 36-38, and 59 depend from claim 32 and should be similarly allowable along with claim 32 for at least the reasons provided above, and on their own merits.

Claim 39 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Blatchford. The rejection is respectfully traversed.

Claim 39 depends from claim 32 and should be similarly allowable along with claim 32 for at least the reasons provided above, and on its own merits. Specifically, Blatchford does not disclose a structure in which the amplitudes are approximately equal from the reflected radiation. Similarly, Blatchford does not disclose a structure in which the phase differences of the reflected radiation substantially mutually cancel when combined. Further, Blatchford does not teach or suggest that "the first index of refraction is approximately 2.1, the second index of refraction is approximately 2.0, the first absorption is approximately 1.2, and the second absorption is approximately 0.3," as recited in claim 39.

The Office action asserts that in col. 4, lines 49-61, Blatchford discloses k1 can be 1.1-1.9, k2 can be 0.15-0.3, and n2 can be 1.7-2.0. Blatchford's col. 4, lines 49-61, however, refers to the embodiment depicted in FIG. 2 in which I-line radiation, rather than DUV radiation (FIG. 1), is used. In the FIG. 2 embodiment, Blatchford discloses that the first anti-reflective coating layer 23 has a thickness of 350-450 Å, n1 of 3.0-3.6, and k1 of 0.7-1.6. The second anti-reflective coating layer 24 has a thickness of 300-400 Å, n2 of 1.8-1.95, and k2 of 0.1-0.4. Blatchford does not teach that the second index of refraction is 2.0 or that the first index of refraction is 2.1. Similarly, Blatchford does not teach that the second absorption is approximately 0.3.

In the FIG. 1 embodiment, which exposes the photoresist to DUV radiation, the first anti-reflective coating layer 13 is merely disclosed with k1 of 1.1-1.9, and the second anti-reflective coating layer 14 with k2 of 0.4-0.8, and n2 of 1.95-2.25. In the FIG. 1 embodiment, Blatchford fails to disclose that the second absorption is approximately 0.3 or that the first index of refraction is 2.1. In fact, Blatchford fails to even suggest a first index of refraction for anti-reflective layer 13.

The Examiner acknowledges that Blatchford "does not disclose that the first index of refraction is approximately 2.1." (Office Action, pg. 4). The Examiner asserts, however, that it would have been within the ordinary skill of one in the art to determine the optimal index of refraction for the first antireflection layer in Blatchford. Applicants respectfully disagree. FIG. 1 is directed to an embodiment in which DUV radiation is used and FIG. 2 is directed to an embodiment in which I-line radiation is used. As Blatchford discloses, the absorption, indices of refraction, and thicknesses of the layers vary tremendously depending on the radiation wavelength. It would not be a matter of routine optimization to obtain an optimum value.

Accordingly, it is not obvious to determine Applicants' claimed first index of refraction of 2.1, especially when Blatchford does not teach or suggest an index of refraction for the first anti-reflection layer 13 in the FIG. 1 embodiment. The Office Action is relying upon the FIG. 2 embodiment for disclosing a second absorption of approximately 0.3. However, the FIG. 2 embodiment's teachings cannot be combined with FIG. 1's disclosure since FIG. 1 is directed to DUV exposure and FIG. 2 is directed to I-line exposure.

For at least these reasons, the Office Action fails to establish a *prima facie* case of obviousness. Blatchford does not teach or suggest all of the claim limitations recited in claim 39 in either the FIG. 1 or the FIG. 2 embodiment, and as noted, the teachings of the two embodiments are not properly combinable. These are additional reasons for the allowance of dependent claim 39.

Claims 40-45, 47 and 48 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Blatchford in view of U.S. Patent No. 6,255,151 ("Fukuda"). The rejection is respectfully traversed.

For similar reasons provided above, Blatchford does not teach a memory cell structure with a first and second anti-reflective layer in which reflected radiation from the first and second interface substantially mutually cancel when combined. Blatchford also does not disclose a structure in which the amplitudes are approximately equal from the reflected radiation. Similarly, Blatchford does not disclose a structure in which the phase differences of the reflected radiation substantially mutually cancel when combined.

As such, Blatchford does not teach or suggest a memory cell comprising "a structure on a substrate . . . [with] at least two active areas . . . a gate stack . . . a capacitor electrically coupled with one of the active areas; a first anti-reflective coating layer formed over the structure . . . a second anti-reflective coating layer formed on at least a portion of the first anti-reflective coating layer . . . and an insulating layer formed over the second anti-reflective coating layer . . . wherein the first and second interface reflects radiation, and wherein the indices of refraction, absorptions, and thicknesses of the first and second anti-reflective coating layers are such that the amplitudes are approximately equal and the phase differences of the reflected radiation from said first and second interfaces substantially mutually cancel when combined," as recited in claim 40. Fukuda is relied upon for disclosing components conventional for a memory cell and adds nothing to rectify the deficiencies of Blatchford.

Moreover, a person of ordinary skill in the art would not have been motivated to combine Blatchford with Fukuda to arrive at the claimed invention. Courts have generally held that, to establish a *prima facie* case of obviousness, a determination of obviousness "must involve more than indiscriminately combining prior art; a motivation or suggestion to combine must exist." Pro-Mold & Tool Co., 75 F.3d at 1573.

In this case, there is no teaching, suggestion, motivation, or incentive to combine Blatchford with Fukuda. The crux of Blatchford is the formation of an anti-reflection coating between a non-planar substrate and a photoresist layer "to alleviate the problems caused by non-uniform reflection at the substrate surface during exposure of the photoresist layer." (Abstract). In contrast, the crux of Fukuda is the creation of an offset between the cell array and the peripheral circuit region of a memory cell by providing an insulating film within the peripheral region and having a thickness equal to the height of each capacitor (Col. 1, line 66 through Col. 2, line 2). The only element

in which Blatchford and Fukuda share is the substrate on which their respective structures are formed. A person of ordinary skill in the art would not have been motivated to combine Blatchford with Fukuda. The references are directed to entirely different problems.

"A statement that modifications of the prior art to meet the claimed invention would have been 'well within the ordinary skill of the art' at the time the claimed invention was made because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references." M.P.E.P. § 2143.02. There is no objective reasoning to combine Blatchford and Fukuda: both references are directed to solving entirely different problems. It is impermissible hindsight reconstruction to combine the references.

Accordingly, there is no motivation or suggestion to combine a reference directed to providing an insulating film within a peripheral region and having a thickness equal to the height of a capacitor, e.g., Fukuda, with a reference directed to the formation of an anti-reflection coating between a non-planar substrate and a photoresist layer, e.g., Blatchford. Consequently, the cited references do not teach or suggest claim 40. Claims 41-45 and 47-48 depend from claim 40 and should be similarly allowable along with claim 40 for at least the reasons provided above, and on their own merits.

Claim 46 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Blatchford in view of Fukuda, and further in view of U.S. Patent No. 6,140,179 ("Chen"). The rejection is respectfully traversed.

Claim 46 depends from claim 40 and should be allowable along with claim 40 for at least the reasons provided above, and on its own merits. Specifically, Blatchford does not teach a memory cell structure with a first and second anti-reflective layer in which reflected radiation from the first and second interface substantially mutually cancel when combined. Blatchford also does not disclose a structure in which the amplitudes are approximately equal from the reflected radiation. Similarly, Blatchford does not disclose a structure in which the phase differences of the reflected radiation substantially mutually cancel when combined.

Moreover, as discussed above, there is no motivation to combine Blatchford with Fukuda. Chen is relied upon for disclosing crown (container) capacitors and adds nothing to rectify the deficiencies of Blatchford and Fukuda.

Claim 50 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Blatchford in view of U.S. Patent No. 6,287,959 ("Lyons") and Fukuda. The rejection is respectfully traversed.

For similar reasons provided above, Blatchford does not teach an integrated circuit structure with a first and second anti-reflective coating layer in which reflected radiation from the first and second interface substantially mutually cancel when combined. Blatchford also does not disclose a structure in which the amplitudes are approximately equal from the reflected radiation. Similarly, Blatchford does not disclose a structure in which the phase differences of the reflected radiation substantially mutually cancel when combined.

As such, Blatchford does not teach or suggest an integrated circuit comprising "at least one memory cell, the memory cell comprising: a structure . . . at least two active areas . . . a gate stack . . . a capacitor . . . an etch stop layer comprising: a

first anti-reflective coating layer formed over the structure . . . a second anti-reflective layer formed over and in contact with at least a portion of the first anti-reflective coating layer . . . wherein the first and second interface reflects radiation, and wherein the indices of refraction, absorptions, and thicknesses of the first and second anti-reflective coating layers are such that the amplitudes are approximately equal and the phase differences of the reflected radiation from said first and second interfaces substantially mutually cancel when combined; and an insulating layer formed over the structure," as recited in claim 50. Lyons is relied upon for disclosing that silicon oxynitride can be used as a successful antireflective layer and etch stop, and adds nothing to rectify the deficiencies of Blatchford.

Claim 51 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Blatchford in view of Fukuda and U.S. Patent No. 5,724,299 ("Podlesny"). The rejection is respectfully traversed.

For similar reasons provided above, Blatchford does not teach a computer system with a first and second anti-reflective coating layer in which reflected radiation from the first and second interface substantially mutually cancel when combined. Blatchford also does not disclose a computer system in which the amplitudes are approximately equal from the reflected radiation. Similarly, Blatchford does not disclose a computer system in which the phase differences of the reflected radiation substantially mutually cancel when combined.

As such, Blatchford and Fukuda do not teach or suggest a computer system comprising "a processor; and a memory, the memory comprising at least one memory cell, the memory cell comprising: a structure . . . at least two active areas . . . a gate stack . . . a capacitor . . . a first anti-reflective coating layer formed over the structure . . . and a second anti-reflective coating layer formed in contact with the first anti-reflective

coating layer, wherein the first and second interface reflects radiation, and wherein the indices of refraction, absorptions, and thicknesses of the first and second anti-reflective coating layers are such that the amplitudes are approximately equal and the phase differences of the reflected radiation from said first and second interfaces substantially mutually cancel when combined" as recited in claim 51. Podlesny is relied upon for disclosing a memory cell array typically used as memory for a computer system, and adds nothing to rectify the deficiencies associated with Blatchford and Fukuda.

Moreover, Applicants also respectfully submit that one of ordinary skill in the art would not have been motivated to combine Blatchford with either Fukuda or Podlesny to arrive at the subject matter of claim 51. Blatchford addresses "problems caused by non-uniform reflection at the substrate surface during exposure of the photoresist layer" (abstract); whereas Fukuda addresses the creation of an offset between the cell array and the peripheral circuit region of a memory cell, while Podlesny addresses the formation of a cross-coupled sense amplifier as a storage element. The only element which all three references have in common is the substrate on which their respective structures are formed.

Claim 61 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Blatchford in view of Lyons. The rejection is respectfully traversed.

As indicated above, Blatchford does not teach an integrated circuit structure with a first and second anti-reflective coating layer in which reflected radiation from the first and second interface substantially mutually cancel when combined. Blatchford also does not disclose a structure in which the amplitudes are approximately equal from the reflected radiation. Similarly, Blatchford does not disclose a structure in which the phase differences of the reflected radiation is approximately 180 degrees different.

As such, Blatchford does not teach or suggest an integrated circuit comprising "a reflective layer having a reflective surface; and an etch-stop layer comprising: a first anti-reflective coating layer formed over the reflective surface, the first anti-reflective coating layer having a first index of refraction, a first absorption, a first thickness, and an upper surface defining a first interface; and a second anti-reflective coating layer in contact with said first anti-reflective coating layer, the second anti-reflective coating layer having a second index of refraction, a second absorption, a second thickness, and an upper surface defining a second interface, wherein the first index of refraction is different from the second index of refraction and the indices of refraction, absorptions, and thicknesses of the first and second anti-reflective coating layers are such that the amplitudes of all sources of reflected radiation are approximately equal and the phase differences of said reflected radiation is approximately 180° out of phase," as recited in claim 61. Lyons is relied upon for disclosing that silicon oxynitride can be used as a successful antireflective layer and etch stop, and adds nothing to rectify the deficiencies of Blatchford.

Applicants also respectfully submit that the prior art of record does not teach or suggest the subject matter of claim 63. Claim 63 recites an integrated circuit comprising "a reflective layer having a reflective surface; and an etch stop layer formed over said reflective layer consisting of: a first anti-reflective coating layer having an upper surface defining a first interface; and a second anti-reflective coating layer having an upper surface defining a second interface, wherein the reflective layer, first interface, and second interface reflects radiation, and wherein the first and second anti-reflective coating layers are formed such that the amplitudes and phase differences from said reflected radiation substantially cancel when combined at or below said second interface." Blatchford's anti-reflective coating 17 comprises of at least three different layers and does not consist of a first and second anti-reflective coating layer.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

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